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PROGRESS
The National Tool and Die Journal

Adding To The Efficiency Of Modern Machines

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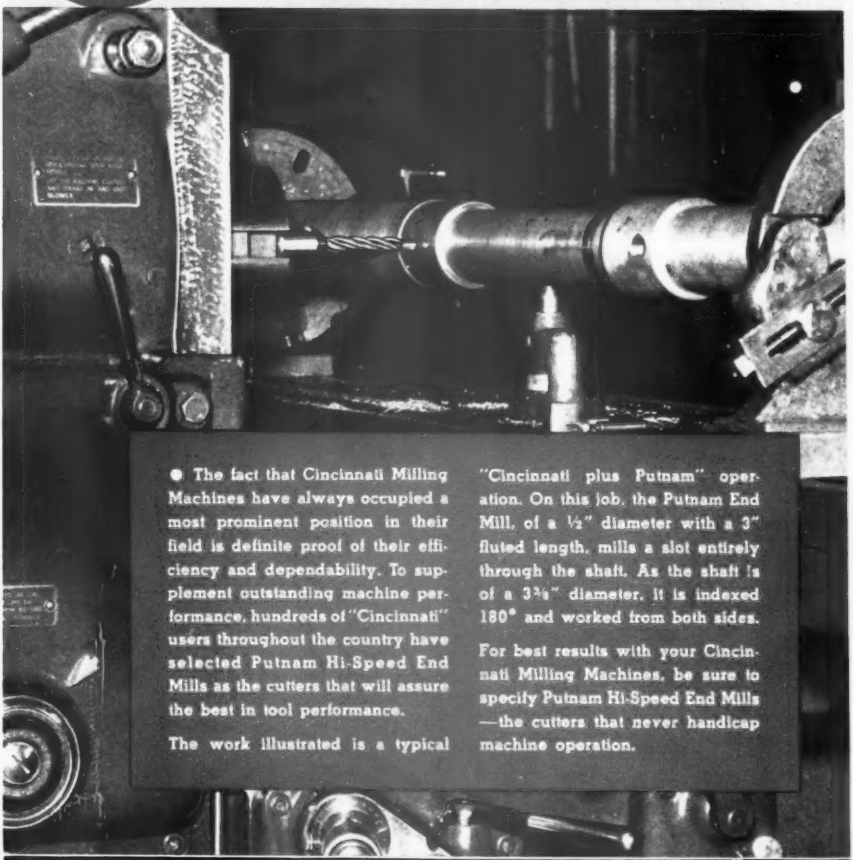

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MARCH
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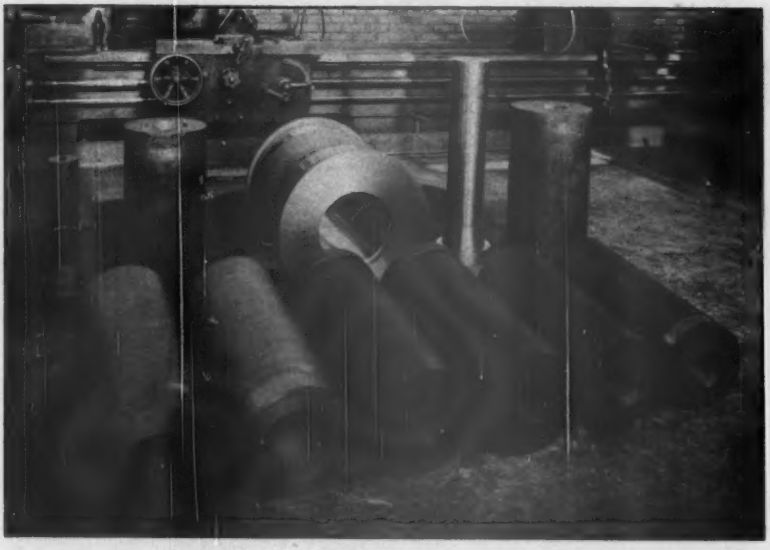

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TOOL·DIE·MACHINE PROGRESS
The National Tool and Die Journal

Editor
George J. Huebner
Assistant Editor
Paul L. Reed

Official Organ of the Special Tool, Die and Machine Shop Institute

Vol. 5 **MARCH, 1940** **No. 12**

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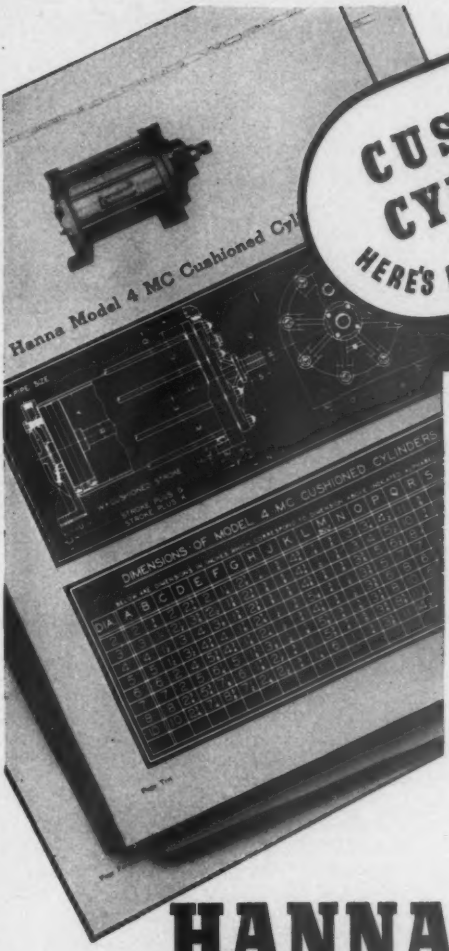

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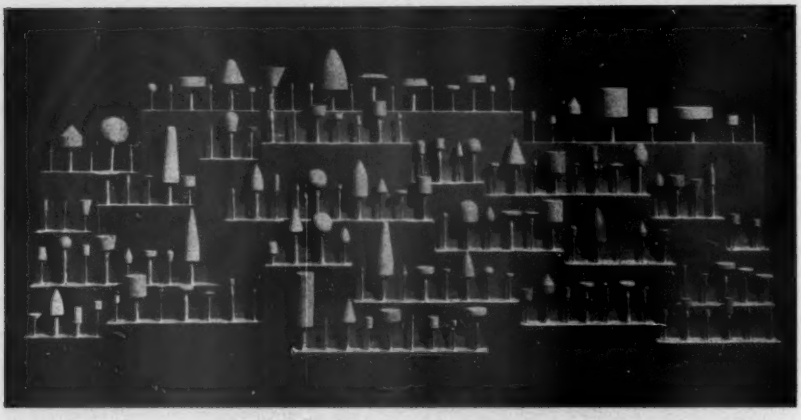

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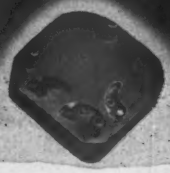

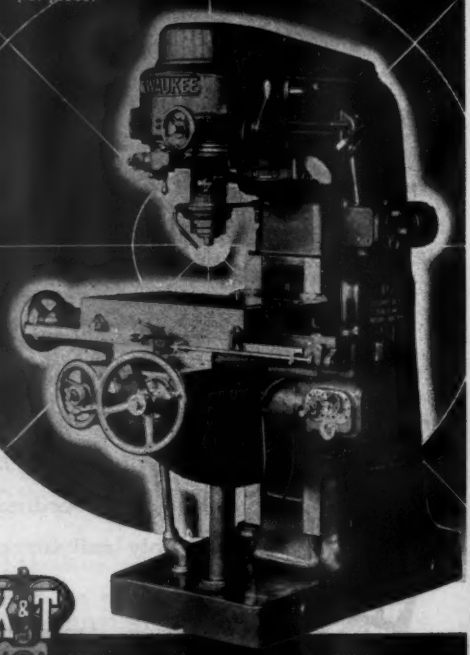

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The National Tool and Die Journal
March, 1940 Vol. 5, No. 12

PLASTIC MOLD DESIGNING

By GORDON B. THAYER
Plastics Design Engineer
General Industries Company

Article I of a Series

Accurate design and construction of molds and efficient production of molding machines are about to accomplish for the Plastics Industry what the development of modern dies and presses has accomplished so well for the metal stamping industry. Mold design bears the same important relationship to the economical manufacture of perfect plastic products as die design does to metal stampings; in fact, it is the opinion of L. S. Gleason of the General Electric Plastics Department that "the crux of the whole molding process is the manufacture of accurate, well-designed molds." This introductory article on plastic mold designing is the first of a series which is being published specifically upon request of readers for definite, practical information for plastic mold design and construction.

Introduction

MOLDS for plastic materials have been made in some manner for centuries. Some of these molds were fine works of art, as, for example, the molds used by craftsmen in glass. The coming of the modern plastic molding materials brought about great advancement in this old art, and transformed it into a science. Mass production molding machinery has been developed, and new mold steels and alloys have been introduced to withstand the resulting severe service. Accuracy is a requirement in modern manufacturing, and molded plastics are produced by steadily mounting standards of precision, which has necessitated new machine tool applications and methods.

A plastic mold is one used for forming a plastic material into a finished product. Molds are made of S.A.E. and similar steels which are "case-hardened" to give the hard surfaces necessary to withstand the operating pressures, to have long wearing qualities, and to take and maintain a high polish. Molding materials require heat and usually pressure to achieve the plasticity necessary for them to flow into the shape of the mold cavity. Pressure is required to force the material into the cavity and to hold it to shape until it is set, and to

give the casting or finished product the required strength. A mold must be polished to give the casting a good finish, and to allow it to be ejected easily.

A mold for the general run of molded parts is divided into two halves which meet at the parting line. These halves are mounted on backing plates which are drilled to allow passage of steam or cooling water, and which carry the guide pins which align the halves of the mold. The mold halves and backing plates assembled constitute the mold proper.

In this series, the fundamentals of plastic mold design will be discussed, after which they will be applied to representative types of molds—compression and injection. Two methods for mold sinking will be discussed: hobbing, and machining and duplicating. Fundamental ideas will be discussed as they appear and are applied.

Since many factors enter into the design of plastic molds, and into the design of products to be molded, it is well for product designers, tool designers, and tool makers to have a common understanding of plastic molds and molding in order to cooperate to the fullest extent in making possible molded products of high standards of quality and economy.

Requirement for mold designing

To design plastic molds, a plastics engineer should have an intimate knowledge of a proper design procedure which is based upon a knowledge of the characteristics of materials; of the technique of mold building; of the economics of each production schedule; of the tooling cost both to purchaser and to the mold builder; of molding equipment operation; of the special mold steels and alloys; and of the molding and finishing facilities of his own plant.

The design of plastic molds includes, besides the design of the mold proper, the provision for mounting the mold in a press; the provision of means to eject the finished molded casting; and a provision for temperature control. There are also finishing tools to be designed, such as drilling jigs, buffing attachments, holding fixtures, shrink blocks, gages, and other devices for obtaining accurate and economical production.

Two general types of plastic molding in general use

There are two types of plastic molding in general use—compression molding and injection molding. A general treatment of these types recently appeared in this publication.*

The mold designer does not always have complete information on the product his mold must produce. Usually a sketch or drawing is supplied, and sometimes a model. The model is useful since a molding or finishing feature may appear in three dimensions which would escape notice on a drawing. A model, while desirable, is not absolutely necessary, and most molds are built without their use. Like the die or the die casting designer, the mold designer can very frequently find details which may be altered slightly to allow more convenient and economical molding. The mold designer can render a real service by making such suggestions for approval before completing his design.

A number of factors determine the design or design recommendations. The total production required influences the quality or type of steel chosen. The rate of production determines the number of impressions desirable in a mold and the size of press equipment to be selected. The strength or finish of the product often dictates the type or physical form of plastics material and the tolerances to be used.

The designer must also consider the molding operation itself. Such factors as the relation of shape of the part to its position in the mold, the loading of inserts and molding material, the removal of parts from the mold, handling of molded parts, and the provisions for the protection of loose bars, side pieces or thread plugs, all are properly a part of elastic mold design. The experienced mold press operator can often offer valuable suggestions which should be employed if practicable.

*"A First Look at Plastic Molding," November 1939, Page 9.

The design of a simple mold for a thermosetting material will be discussed in the next article. The mold will be designed for use in a compression molding machine.

Die Designing and Estimating

By CHARLES BOHMER
and
GEORGE DANNES

Article II of a New Series

This series is an extension of the 1938 Bohmer and 1939 Dannes series. Each month a die is designed and estimated. All tables, charts and figures referred to were published in the Advanced Series "Die Designing and Estimating" now available in book form (see Page 44). The authors request that all questions or points readers may wish answered or clarified be directed to this publication. Next month the second or double block and pad die will be designed and estimated.

—*The Editor.*

Design and Estimate of a Pierce, Extrude, Semi-Pierce, Cut-Off and Partially Form Die

Analyses of Design and Application of Method for Estimating Time Required to Machine and Assemble Parts

Design

The Part

THIS die is of particular interest because it performs so many different operations on the piece part. The part is a bracket for which round edge flat stock or wire is used. Because it is to be used principally as a clamp, all dimensions except those of the semi-pierced holes may vary as much as ± $\frac{1}{64}$ of an inch.

The Die

The shape of the part and the comparatively small production which is required make it economical to build and use two dies, the first to pierce, extrude, semi-pierce, cut-off and partially form and the second a double block and pad die to complete the forming.

Operation of Die

The first die functions thus: When the material is introduced into the die it is located by the primary stop (Detail 28), and the .144 inch hole is pierced. The stock then moves forward until it is flush with the front cut-off edge when the .144 inch hole and the pilot will be so nearly in line that the second stroke will accomplish the necessary accurate locating. In addition to the piercing, this second stroke takes care also of the holes which must be extruded and semi-pierced.

Now the strip stock moves forward to the stop (Detail 1) and on the third and final stroke the cut-off and forming are accomplished and the part is ready for finish-forming in the second die. It always requires three strokes of the press to finish the first blank from each new strip of material, after which a complete part is made with every stroke.

The principles of correct die construction have been carefully adhered to in the design of this die. Most of the Details will be readily understood from the drawing and the Material List, but several require special attention.

The center distance between the piercing and extruding punches (Details 11 and 13) must be the equivalent of twice the distance from the end of the finished part plus the width of the cut-off punch.

The center distance between the pilot (Detail 7) and the extruding punch (Detail 11) must conform perfectly to the development established by the form.

The semi-piercing punches (Detail 9) are the conventional type but are made .005 inch longer than the die to prevent the slug or dowel (.125 inch diameter) from coming out on the upstroke.

The spring pins (Detail 33) are necessary to properly strip the piece parts out of the die.

The extruding punch (Detail 11) is a double step type, the front sharpened to resemble an inverted "V" to insure a clean cut, and with its body diameter correct to form the extrusion on the second step. The die hole must be made smaller than the outside diameter of the extrusion to compensate for the reduction of material thickness due to excessive stretch. Stripping from the die is accomplished by the punch and additional provisions are not necessary.

The distance from the top of the die to the bottom of the stripper must be enough to allow free passage of the material without binding on the extrusion. A clearance slot or groove must be made in the cut-off and form section to clear the extrusion during cutting-off and to permit forming to take place without destroying the extrusion and semi-piercings.

Provisions for economical maintenance are made by employing individual sections for the cut-off.

This permits sharpening the cutting edges and then removing the same amount from the bottom or back portions of the form sections without change in relative heights.

Stripping provisions in the form section are not needed because of the shape and the freedom of the part after forming; however, due to the possibility of the part adhering to the form punch because of lubricants or other reasons, two light spring stripper pins (Detail 6) are used.

All working sections of the die are made of tool steel, hardened and ground where necessary. All other parts such as stripper, punch plate, etc., remain soft.

Estimate

MACHINING AND GRINDING

Column A—for time values see Table, Fig. 6.

	Machining hr.	Grinding hr.
DIE—Det. 34—1" x 2½" x 5½" TS	.6	.8
DIE—Det. 19—1" x 1" x 3½" TS	.4	.6
DIE—Det. 3—1" x 2½" x 4½" TS	.6	.8
PUNCH—Det. 8—1½" x 2" x 3½" TS	.5	.7
PUNCH—Det. 4—1¾" x 2¼" x 4⅜" TS	.6	.8
PUNCH PAD—Det. 12—⅝" x 2½" x 4½" CRS	.4	.5
STRIPPER—Det. 32—½" x 2½" x 5½" CRS	.4	.6

	Machining Hr.
BACK GAGE—Det. 15—¼" x 1" x 9½" CRS ....with	
STOCK REST—Det. 16—¼" x 1" x 2" CRS	.3
STOP—Det. 1—⅝" x 1" x 1⅜" CRS	.3
TOTAL Column A	8.9 hrs.

DRILLING ALL HOLES EXCEPT FOR PERFORATORS AND PILOTS

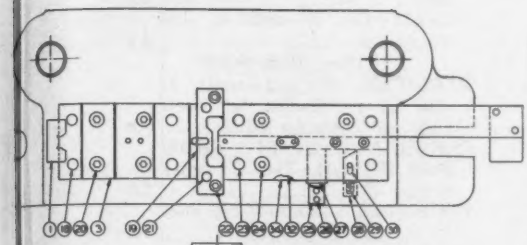
Column B—for time values see Table, Fig. 7

DIE—Det. 34—4 screws, 3 dowels + 2 screws for No. 1	1.0 hr.
DIE—Det. 19—2 screws, 2 dowels	.5
DIE—Det. 3—4 screws, 4 dowels	.9
PUNCH—Det. 4—4 screws, 2 dowels	.7
PUNCH—Det. 8—2 screws, 2 dowels	.5
PUNCH PAD—Det. 12—4 screws, 2 dowels	.7
STRIPPER—Det. 32—4 screws, 3 dowels	.8
BACK GAGE—Det. 15—2 screws, 2 dowels	.5
(Also 2 rivet holes in back gage and stock rest)	.3
STOP—Det. 1—2 screws	.3

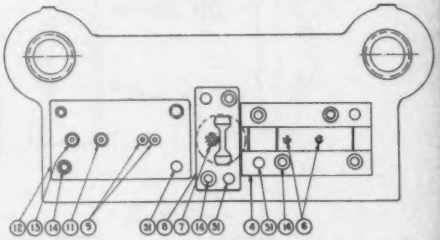
PUNCH HOLDER—10 screws and 6 dowels 1.7
DIE SHOE—10 screws and 8 dowels 1.9

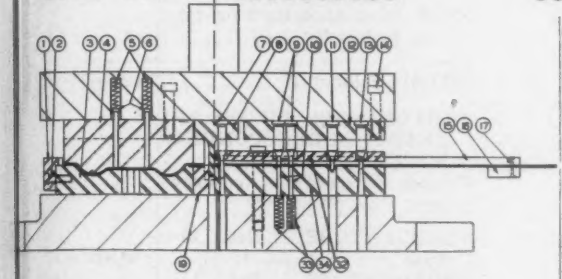
TOTAL Column B ..... 9.8 hrs.

Plan View of Die

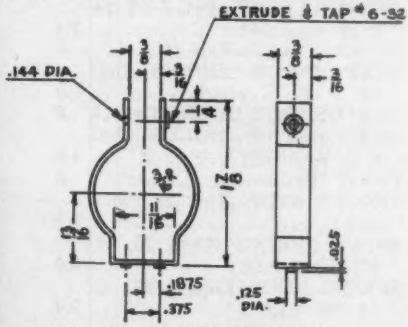


Plan View of Punch—Inverted





Section on Center Line of Die Assembly



Bracket—.049″ CR Flat Wire

Fig. 42. Pierce, Extrude, Semi-Pierce, Cut-Off and Partially Form Die. Designed by E. Taylor, Courtesy: Federal Tool Corp., Chicago.

MATERIAL LIST

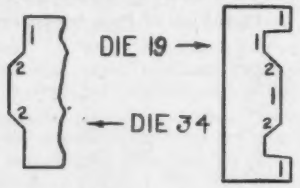
Det.	Rep.	SIZE & MATERIAL	Remarks
1	1	⅝″ x 1″ x 1¾″ STOP CRS	
2	2	¼″–20 x ¾″ SOC. HD. SCR.	
3	1	1″ x 2½″ x 4½″ DIE TS	Hdn. & Gr.
4	1	1¾″ x 2¼″ x 4¾″ PUNCH TS	Hdn. & Gr.
5	2	SPRINGS FOR STRIPPER PINS	
6	2	STRIPPER PINS	
7	1	PILOT	
8	1	1⅛″ x 2″ x 3½″ PUNCH TS	Hdn. & Gr.
9	2	DOWEL HOLE PUNCHES	
10	2	STRIPPER PINS	
11	1	EXTRUDED HOLE PUNCH	
12	1	⅝″ x 2½″ x 4½″ PUNCH PAD CRS	
13	1	PUNCH .144″ Dia.	
14	8	⅛″–18 x 1¼″ SOC. HD. SCR.	
15	1	¼″ x 1″ x 9½″ BACK GAGE CRS	
16	1	¼″ x 1″ x 2″ STOCK REST CRS	
17	2	⅛″ x 4 /8″ F. H. RIVETS	
18	4	⅜″ x 1½″ DOWELS	
19	1	1″ x 1″ x 3½″ DIE TS	Hdn. & Gr.
20	4	⅛″–18 x 1¼″ SOC. HD. SCR.	
21	2	½″ x 1¼″ DOWELS	
22	2	¼″–20 x 1¼″ SOC. HD. SCR.	
23	4	⅝″ x 1½″ DOWELS	
24	4	⅜″ x 2″ SOC. HD. SCR.	
25	1	PUSHER SPRING	
26	2	No. 10-32 x ⅜″ R. H. SCR.	
27	1	STOCK PUSHER	
28	1	FINGER STOP	
29	1	FINGER STOP SPRING	
30	1	FINGER STOP RET.PIN	
31	10	⅜″ x 1½″ DOWELS	
32	1	½″ x 2¼″ x 5½″ STRIPPER CRS	
33	2	STRIPPER PIN SPRINGS	
34	1	1″ x 2½″ x 5½″ DIE TS	Hdn. & Gr.

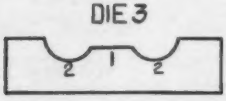
LAYOUT AND INSPECTION

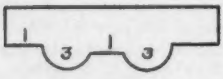
Column C—for contour time values see Tables, Figs. 9, 10, 11, 12.

Layout

DIE—Det. 34—5 units ..... .5 hr.
DIE—Det. 19—8 units 8
DIE—Det. 3—5 units 5
PUNCH—Det. 4—8 units 8







PERFORATORS—Det. 9, 11, 13, and Pil. 7 @ 2 units each. 1.0

Inspection

DIE—Det. 34 ..... 1.0
DIE—Det. 19 ..... 1.3
DIE—Det. 3 ..... 1.0
PUNCH—Det. 4 ..... 1.3

TOTAL Column C ..... 8.2 hrs.

MACHINING, FINISHING AND FITTING DIE PARTS

Column D—use contour units as established for Column C, also drawings and Tables, Figs. 13-20.

	Machining and Finishing Hrs.
DIE—Det. 34—(Table, Fig. 19)—units 5, size 3 sq. inches ¼" deep	1.4
DIE—Det. 19—(Fig. 19)—units 8, size 4 sq. inches ½" deep..	2.4
DIE—Det. 3—(Fig. 19)—units 5, size 12 sq. inches ½" deep..	5.6
PUNCH—Det. 4—(Fig. 19)—units 8, size 12 sq. inches ½" deep	5.6
PUNCH—Det. 8—units 6, size 4", type 2 ..... (See illustration)	6.0
STRIPPER—Det. 32—units 5, size 1.5 sq. inches ¼" deep (70% of Table for CRS)	.8
CLEARANCE IN DIE SHOE FOR PUNCH—Det. 8—units 6, size 4"	1.8
STOP—Det. 1—units 3 for nest ¼ sq. inch x ½" deep	.3
STOP—Det. 1—units 2 for mtg. 1 sq. inch x ½" deep	.3
TOTAL Column D	24.2 hrs.

PERFORATORS, PILOTS AND THEIR CORRESPONDING HOLES

Column E—see Table and drawings, Figs. 21-26.

PERFORATORS — Det. 13—Type 2	.9 hr.
PERFORATORS — Det. 11—Type 2	.9
PERFORATORS—Det. 9—Type 2 (2 required)	1.4
PILOT—Det. 7—Type 2	.9
PERFORATOR HOLES—Det. 13	.9
PERFORATOR HOLE—Det. 11	.9
PERFORATOR HOLES—Det. 9 (2 required)	1.8
PILOT HOLE—Det. 7.....	.9
FINGER STOP—Det. 28 (incl. mtg.)	3.0
STOCK SPRING (Dets. 25, 26, 27) (Inc. mtg.)	3.0
SPRING PINS (Dets. 6, 33) @ 1.7 hrs. each	3.4
TOTAL Column E	18.0 hrs.

ASSEMBLY, TRYOUT, DEVELOPMENT

Column F (see Table, Fig. 28 and accompanying text)

DIE—Det. 34—to shoe (incl. STRIPPER Det. 32)	1.5 hr.
DIE—Det. 19—to shoe	1.0
DIE—Det. 3—to shoe	1.0
PUNCH—Det. 8—to holder ...	1.0

PUNCH—Det. 4—to holder ... 1.0
PERFORATORS TO PUNCH

1 EXTRUSION 2.0
1 FORM 5.0

DIE WORK ESTIMATING SHEET

	A	B	C	D	E	F
Det. 19 DIE	.4.6	.5	.8	2.4		1.0
Det. 3 DIE	.6.8	.9	.5	5.6		1.0
Det. 8 PUNCH	.5.7	.5		6.0		.5 1.0
Det. 4 PUNCH	.6.8	.7	.8	5.6		1.0
Det. 12 PUNCH PAD	.4.5	.7				1.5 2.0
Det. 32 STRIPPER	.4.6	.8		.8		
Det. 15 BACK GAGE	.3	.5				
Det. 16 STOCK REST		.3				
Det. 1 STOP	.3	.3		.3.3		
Det. 34 DIE	.6.8	1.0	.5	1.4		1.5
PUNCH HOLDER		1.7				
DIE SHOE		1.9		1.8		
Det. 9, 11, 13 PERFORATORS and Det. 7 PILOT			1.0			
INSPECTION						
(Die 34 - 1.0; Die 19 - 1.3; Die 3 - 1.0; Punch 4 - 1.3)			4.6			
Det. 13 PERFORATOR					.9.9	
Det. 11 PERFORATOR					.9.9	
Det. 9 PERFORATOR					1.8 1.4	
Det. 7 PILOT					.9 .9	
Det. 28 FINGERSTOP					3.0	
Det. 25, 26, 27 STOCK SPRINGS					3.0	
Det. 6, 33 SPRING PINS					3.4	
DEVELOPMENT						
Extrusion						2.0
Form						5.0
TRYOUT						3.0
	8.9	9.8	8.2	24.2	18.0	19.5

Total 88.6 hrs.

Fig. 43

PAD—Det. 12-4 ..... 2.0
PUNCH PAD TO HOLDER .. 1.5
PILOT TO PUNCH—Det. 8 5
DEVELOPMENT (see chapter 9)

TRYOUT 3.0

TOTAL Column F .....19.5 hrs.
Estimated hours of labor required .....88.6 hrs.

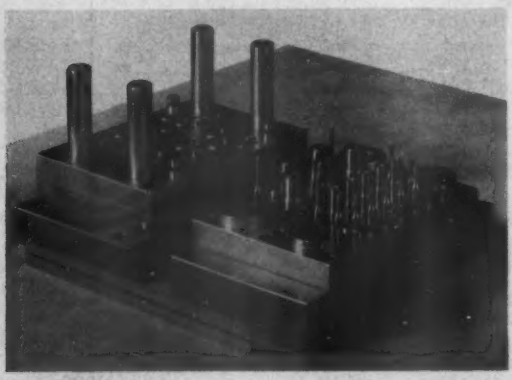
Standard Retainers Simplify Construction of Unusual Progressive Paper Die

THE progressive die illustrated is a three stage multiple piercing and blanking die for making nesting washers from paper .004 of an inch in thickness.

To begin, five holes of .197 inch diameter are pierced across the width of the paper simultaneously with two pilot holes of .187 inch diameter. Next in progression, five washers of .447 inch diameter are blanked out. They drop through and into suitable tubes for collection. Progressing another two stages, five washers are blanked through. These have an outside diameter of .906 inch. and the hole of .447 inch diameter which resulted from the second stage is their inside diameter. After the paper stock has been progressed to this point, ten complete washers are made with each stroke of the press.

This die has 21 punches and pilots which enter the button dies with not more than .0005 inch diameter of clearance, but with the Hovis principle of multiple retainer plate construction, it is always possible to replace both punches and button dies without dismantling the die. The Hovis standard method for retaining interchangeable punches, which is that of a screw interlocked into a slot in the punch, does not permit the introduction of any side strains, thereby assuring that the punch when piercing or stripping is always perfectly free and in its exact axis in the plate. Thus, it is possible to produce a non-heat-treated retainer plate which has thin-walled hardened steel bushings in the punch holes which in turn assures that all of the original accuracy of the precision boring is perfectly maintained. The leader pin bushings and the leader pins are also jig bored in their respective plates, thus making it possible to have perfect alignment between these various members without the so-called fitting or lining-up usually necessary in the building of a die.

This die is used in a 25-ton Henry & Wright Dieing Machine and is similar to but slightly smaller than a die designed and built some two years ago for producing larger washers from the same paper stock. The original die has produced many millions of paper washers, and the Hovis Company has replaced the punches and button dies from time to time as the original ones showed wear. These new parts have always been completely interchangeable with the old ones and without fitting.



More details of the Hovis method for retaining interchangeable punches and button dies may be had by writing the Hovis Screw-lock Company, 3129 Larned Street, East, Detroit, Michigan. A complete catalog is also available. Please mention "TDM PROGRESS" when writing.

Standard multiple retainer plates maintain jig boring accuracy, permitting punch and button die replacement without fitting.

Use Standard Jig and Fixture Parts

Save 50% Designing Time and Many Man-Hours in Construction

HOW TIME IS SAVED:

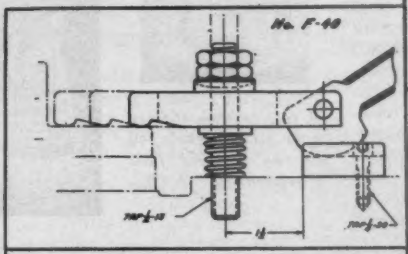
(1) Check your assembly drawings, note details
(2) Select details from Siewek Catalog (loose-leaf binder with working drawings on each page)
(3) Remove sheets with details selected, insert under layout and trace, show location and size of necessary holes
(4) Mark detail with Siewek Catalog number

A wide range of clamps, washers, cams and locks are maintained in stock. ***We also make up special details to order***

Clamps, Cams, Washers, Nuts, Clamp Rests and Hinge Pins are hardened. Studs are alloy steel heat treated.

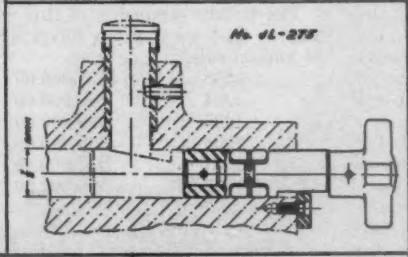
Clamp Assemblies

H-40
J-45
L-60
C-40
F-40
M-15



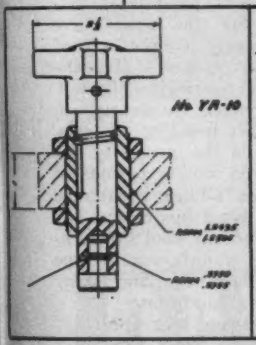
Jack Lock

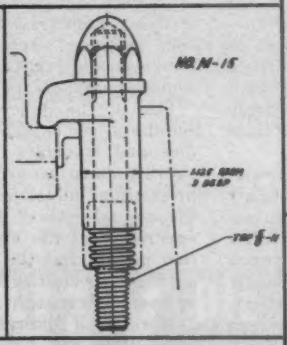
JL-275

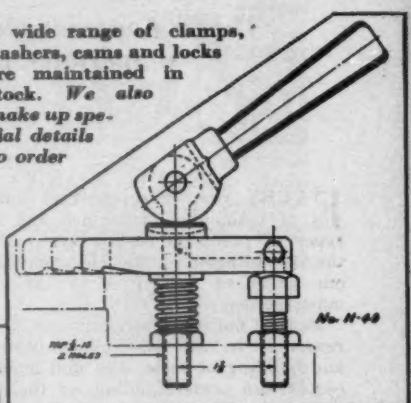


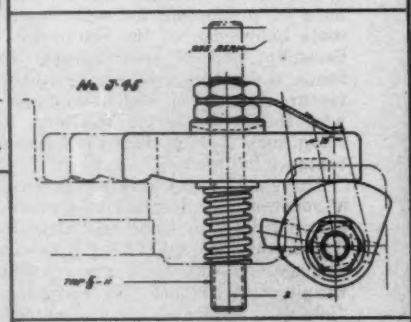
Cam Long Lock Travel Clamp

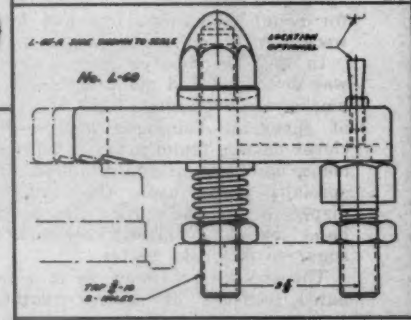
YA-10

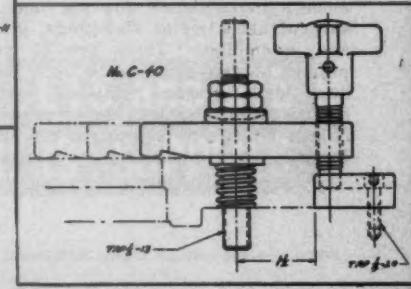












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2348 Wolcott St. **Ferndale, Mich.**

An Industrial Biographical Brevity

How a Contract Shop Developed a Specialty Business

EVERY year more contract builders of tools, dies, machines and other types of precision tooling are realizing the advantages of the development of one or more specialties of their own manufacture.

It is a natural procedure for several reasons. In the first place, designing and building of tools, dies and machines require an understanding of the problems of production as well as an intimate knowledge of the equipment used. Secondly, and of even greater importance, is the fact that economical manufacture must have efficient tooling. And who should be better qualified to develop such tooling than the experienced contract builder?

There are many interesting examples of substantial industrial oaks which have grown from very small tool shop acorns. One is the Federal Tool Corporation of Chicago. Hardly ten years ago Rudolph Bernhardt organized this company as a "job shop." From the beginning, dies for metal stampings, jigs and fixtures were its principal products.

In 1934 the first production specialty was developed and manufactured. This marked the beginning of the Federal line of sprayers, dispensers and servers—clever devices found today in millions of homes and business establishments. These specialty items insure the satisfactory dispensing of products ranging from hand lotions to insecticides and from sugar to pan cake batter.

The specialty division, as it is designated, consists of several thoroughly modern departments for the manufacture of sheet metal stampings, plastics and assemblies. There are 35 punch presses of capacities to 50 tons, Kingsbury drill presses, Haskins tappers, Sleeper and Hartley spring grinders, Nilson Multi-slide equipment and Reed-Prentice plastics molding machines.

A few representative specialties developed at the Federal Tool Corporation of Chicago.

The steady expansion of this company may be best seen by the following group of annual sales:

1933	$ 55,000.00
1934	135,000.00
1935	290,000.00
1936	362,000.00
1937	447,000.00
1938	586,000.00
1939	866,000.00

This year sales of specialties and contract tools and dies should exceed $1,000,000.00. Facilities for the latter have been expanded regularly to take care of increased contract business as well as the requirements of the Specialty Division.

One of the difficulties frequently encountered by contract builders of tools, dies and machines is the necessity for slowing down between tooling periods of production industries, adding greatly to the annual cost of doing business. The experience of the Federal Tool Corporation proves that the manufacture of one or more specialties can be a big factor in overcoming such a condition.

More such interesting biographical brevities will appear from time to time.—The Editor.

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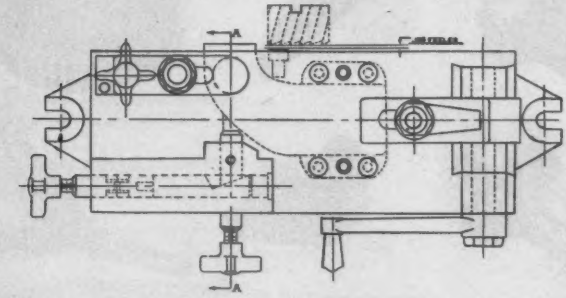
Advantages of Using Standard Parts in Jig and Fixture Building

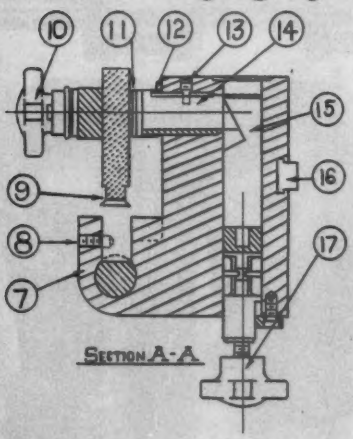
By O. H. Siewek

STANDARDIZATION of parts for jigs, fixtures and the various types of devices required for holding product-parts during machining or assembly operations has distinct advantages for designers, builders and users.

Despite the many different shapes and contours of product-parts, holding them is accomplished by one or more of a comparatively few fundamental methods which usually employ the lever, the wedge and/or the inclined plane. This has made it possible to design clamps, cams, hinges, levers, knobs, etc., which with other standard catalog parts may be assembled into rapid clamping drill jigs and fixture locks.



Designing time and building time both are lessened with standardization of parts for jigs, fixtures and other holding devices.



The illustration herewith is a milling fixture which requires some 17 different parts. Of these, 8 are standard catalog parts, 6 being standardized fixture parts-assemblies, ready to be installed by the fixture builder.

Scale drawings of jig and fixture parts and layouts of assembly units which are adaptable to required dimensional specifications have distinct advantages for designers because: (1) wide usage and acceptance assure correctness of design; (2) less time needs to be devoted to study of details; and (3) less time is required for actual making of working drawings.

The method of procedure is simple. Detail drawings of parts and assemblies are available from the manufacturer. After selecting the detail which fulfills the requirements, the master sheet is removed from the binder and inserted under the layout. The location and size of the necessary holes are noted on the tracing and the assembly or part ordered by stock list number.

The use of standard jig, fixture and various holding parts is economical for small lot production of similar (but not identical) parts because of their flexibility. In large lot production the fewer and shorter maintenance breaks in a run is a further advantage of the use of standardized parts.

In the actual building of jigs and fixtures, the value of having dependable, standard parts and assemblies available should be readily apparent. They should be less costly than if designed and built individually and if the time element is important, such standard parts being obtainable from stock should expedite construction.

A catalog of jig and fixture parts and assemblies for rapid clamping drill jigs and fixture locks may be had by writing to the Siewek Tool Company, 2348 Wolcott Street, Ferndale, Michigan.

Abe and Raterman Advanced by Monarch Machine Tool Co.

P. A. ABE, works manager, and J. A. Raterman, purchasing agent, were elected at a recent meeting of the Board of Directors of the Monarch Machine Tool Company to vice president in charge of engineering and production, and vice president in charge of purchasing and plant engineering, respectively. Abe began with the company in 1915 as a lathe operator, after serving his apprenticeship in St. Mary's, Ohio. He has come up through the ranks as a tool maker, tool room foreman, general foreman, superintendent and works manager. Raterman joined the company in 1917 as a machinist and has successively been a salesman, superintendent in charge of assembly, head of the production control department and purchasing agent. Both Abe and Raterman are also directors of the company.

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Correct speeds and ample power enable using larger tools and giving maximum performance range from lightest to heaviest duty.

Write today for illustrated folder with specifications.

LOCKWIN & COMPANY
205 West Wacker Drive
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New Steel Cutting Shaper Tools Tipped with Kennametal

McKENNA Metals Co. announces the development of standard steel-cutting shaper tools tipped with Kennametal grade KS, for use on shapers and planers to machine steel of hardnesses up to 550 Brinell. This is believed to be the first time that hard carbides have been regularly used on tools for shaping hardened steels.

A feature of these new tools is the unusual tool angles employed, namely: 10° negative back rake, 5° negative side rake, 15° side cutting edge angle and 2° clearances. These tool angles, which must be maintained when regrinding tools for the best results, are made possible by the low frictional resistance between Kennametal and the work being cut. With these tool angles it is unnecessary to lift the tool on the return stroke.

The manufacturer states that Kennametal shaper tools will shape steel of hardnesses above the machinable limit for high speed steel tools at speeds often double those used with high speed steel tools on work in the lower hardness ranges. Die blocks of 42 Rockwell C may be hardened before machining with Kennametal, saving the grinding operation otherwise necessary.

The sizes of tools furnished will fit standard clapper boxes of shapers and planers.

For literature, nearest dealer or trial order, write McKenna Metals Co., 500 Lloyd Ave., Latrobe, Penna.

When you order or write about products described in TDM PROGRESS please mention the publication.

Two New Clamping Tools Developed for Aircraft Industry

TWO new clamping tools, especially suitable for use in the aircraft industry and wherever clamping space is limited, have been developed by the Detroit Stamping Company. This new De-Sta-Co Toggle Clamp is known as No. 220, Aviation model. The two shown in the illustration measure only $1\frac{33}{64}$" by $1\frac{5}{8}$" at the base and they have been especially engineered for quick clamping action, positive holding and instant release. The raising of the operating handle delivers a pressure ratio of 33 to 1 to the clamping arm.

The De-Sta-Co Toggle Pliers No. 460, "Light Duty" model, likewise shown in use in the illustration, measure $6\frac{15}{32}$" in length over all. The lock nut permits quick adjustment of the clamping head for space from -0" to $\frac{11}{16}$", thus proving efficient for a wide variety of work. The closing of the handles exerts a great pressure ratio of 75 to 1 at the clamping end of the pliers. Toggle pliers such as these provide quicker and more accurate clamping than the so-called C clamps, and have been replacing them generally.

For details, prices and nearest source of supply for De-Sta-Co Toggle Clamp No. 220 or Toggle Pliers No. 460, write Detroit Stamping Co., 3443 West Fort St., Detroit, Mich.

DIE BOOKS

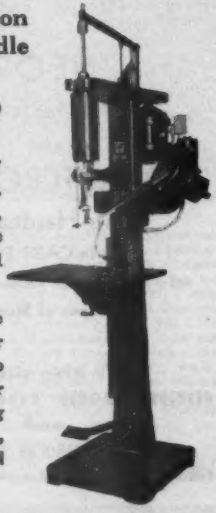
We publish "Die Designing and Estimating" (see Page 44) and can furnish any book in this field promptly on order. Editor TDM PROGRESS, 2460 Fairmount Blvd., Cleveland, Ohio.

NEW

HEAVY DUTY MODEL C

Magazine Feed Power Screwdriver

A rugged production machine built to handle tough assembly jobs.



Drives cap screws up to 60 foot pounds tension.

Capacity from ¼" to ⅝" cap screws up to 2¼" long. Also standard machine screws, wood screws, hex or square headed pipe plugs, and special screws.

We also manufacture hopper feed screwdrivers for screws ranging from No. 4 to ¼" diameters; also motor driven hoppers for feeding screws, screw blanks, pins, rivets, nuts, flat washers, and other small parts.

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Send samples for production estimates.

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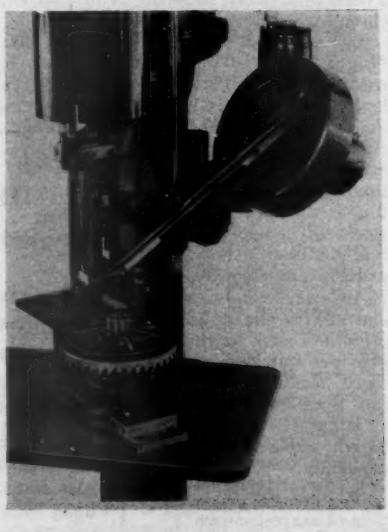
New Heavy Duty Magazine Feed Power Screwdriver

A TOOL of real value to shops that build special machines or do assembly work of any kind has just been announced by the Detroit Power Screwdriver Company of Detroit. The machine is very rugged in construction, designed to withstand the strain of real power screwdriving. It is designed to drive cap screws and other screws in assemblies that require maximum tension.



The illustration shows the machine set up to drive ⅜" hardened cap screws in ring gear assemblies. These screws are all driven to 55 foot pounds tension and the user reports a production of one ring gear assembly per minute. This is remarkably fast since there are ten screws to drive, in addition to handling the heavy assembly into the fixture and placing a lock washer under each screw from tray attached to fixture.

The patented barrel type hopper is individually motor driven to assure uniform hopper speed regardless of screwdriver spindle speed. This hopper is designed to eliminate any damage to motor or gears should foreign material get into it with the screws.

(Continued on Page 32)

When you order or write about products described in TDM PROGRESS please mention the publication.

Dykem Markets Non-Drying Blue

THE Dykem Company, manufacturers of color specialties for the machine tool industry, announces a new non-drying blue for locating high spots on bearing surfaces. Designated as Dykem Hi-Spot Blue No. 107, the new paste is intensely blue, smooth and soft, free of grit, uniform from batch to batch and most important, *does not dry out.* The new paste, developed after a thorough research for a preparation more satisfactory than Prussian Blue, can be left on the master or bearing surface day in and day out; the film remains "wet" and "transferable" saving the tedious hand operation otherwise necessary.

Dykem Hi-Spot Blue No. 107, because it spreads easily and evenly, is particularly valuable for scraping on flat bearing surfaces of lathes, planers, grinders, milling machines, etc.

For prices or new circular on Dykem Hi-Spot Blue No. 107, write The Dykem Co., 2299 N. 11th St., St. Louis, Mo.

New Micro-Lok Boring Bar Data

THE extreme precision work required in the building of dies, molds, machines and special tools for high production necessitates the use of boring and reaming bars with adequate rigidity and cutting ability. MIKRO-LOK boring and reaming tools are micrometer adjusting and self locking. With them it is possible to make quick, accurate and simple adjustment to very close limits.

The adjusting mechanism is sturdy, well balanced, and because it is entirely enclosed it is free from obstructions which tend to increase accumulation of foreign substances. The MIKRO-LOK line includes bars especially designed for the various types of jig boring machines used in tool rooms, die and mold shops; production boring tools; double end-blade boring bars, general purpose boring bars with straight end taper shanks, and floating blade reaming bars.

More of the time-saving features of the MIKRO-LOK line are described in a new catalog which describes also the complete Eclipse line of counterbores, counter-sinks, multi-diameter cutters and other special cutting tools of many kinds.

For Catalog 35R, write Eclipse Counterbore Company, 7428 St. Aubin Ave., Detroit, Michigan.

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our equipment,
workmanship
and experience.

THE BUNELL MACHINE & TOOL COMPANY

Telephone: PRospect 2681

1620 East 24th Street Cleveland, Ohio

New Power Screwdriver

(Continued from Page 30)

The machine is particularly adaptable for driving cap screws in pressure pumps, single cylinder heads, heavy duty valves, drain plugs, square or hex headed plugs and pressure valves. The manufacturer states that production estimates will be given on sample assemblies submitted to them.

For full details of the Detroit Heavy Duty Magazine Feed Power Screwdriver or a production estimate, write the Detroit Power Screwdriver Co., 5369 Rohns Ave., Detroit, Mich.

Famco Arbor Presses are Durable and Efficient

FAMCO Arbor Presses are well known for their durability of construction and efficiency of operation. Frames are of semi-steel and rams and pinions are cut from specially selected steel. Heavy stub teeth in the rams and pinions reduce breakage to a minimum. Presses are accurately machined and are all equipped with square racks or rams carefully fitted for proper alignment.

Famco Arbor Presses are built in plain lever, simple ratchet, compound ratchet and combination compound and simple ratchet types. Both floor and bench types are included in the line. The company also makes a line of foot presses, widely used in the production of light metal stampings.

Write for circular listing specifications and prices to Famco Machine Company, 1302 18th St., Racine, Wis.

Continental Issues Bulletins on Precision Saws and File Bands

CONTINENTAL MACHINES, INC., manufacturers of the DoAll Contour Machines have issued two bulletins —one on DoAll Precision Saws, the other on DoAll Precision File Bands.

The first bulletin lists both raker tooth saws with heavy and light set; "A" temper saws for cutting high chrome high carbon steel and other alloys of a high carbon content and "B" temper saws for tool steels, mild steels, cast iron, hard bronze, etc., and straight tooth heavy set saws for most non-ferrous metals like aluminum, brass, copper, lead and zinc. A straight tooth saw, also in the

(Continued on Page 40)

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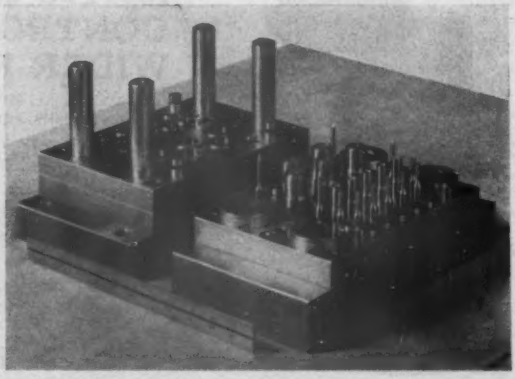

A counterpart of this die, built two years ago, has produced many millions of similar paper washers and is still in regular service.

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● **This directory of products lists for ready reference the names of manufacturers and dealers whose sales to Tool·Die·Machine PROGRESS readers have established them as dependable in every sense of the word. They merit your consideration.**

● **Complete information about any product may be had upon request made to the firm listed or to us.**

● **Your mention of Tool·Die·Machine PROGRESS will be appreciated.**

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Forging & Casting Corp., The, Ferndale (Detroit), Mich.
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George Gorton Machine Co., 1116—13th St., Racine, Wisconsin.
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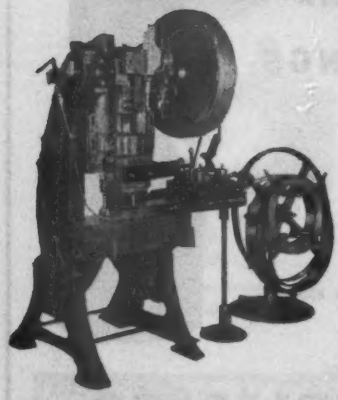

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Knu-Vise, Inc., 6433 Cass Ave., Detroit, Mich.
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Star Tool & Die Works, 2822 24th St., Detroit, Mich.
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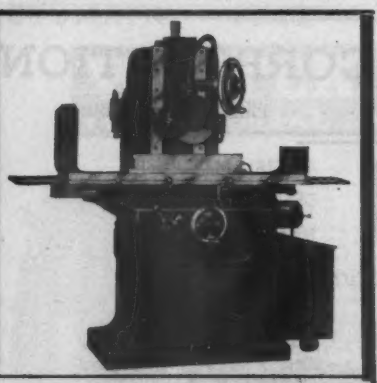

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(Continued from Page 32)

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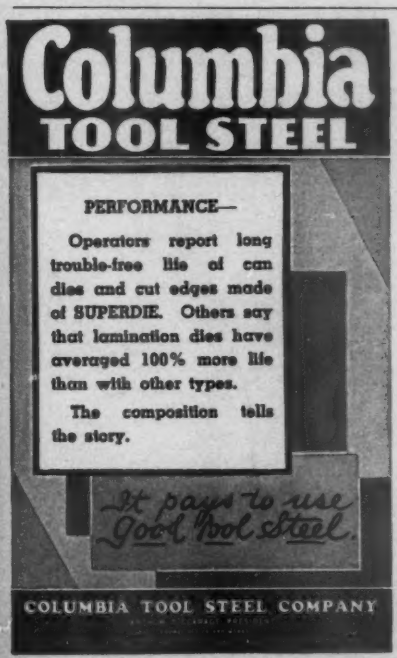
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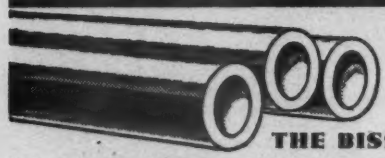

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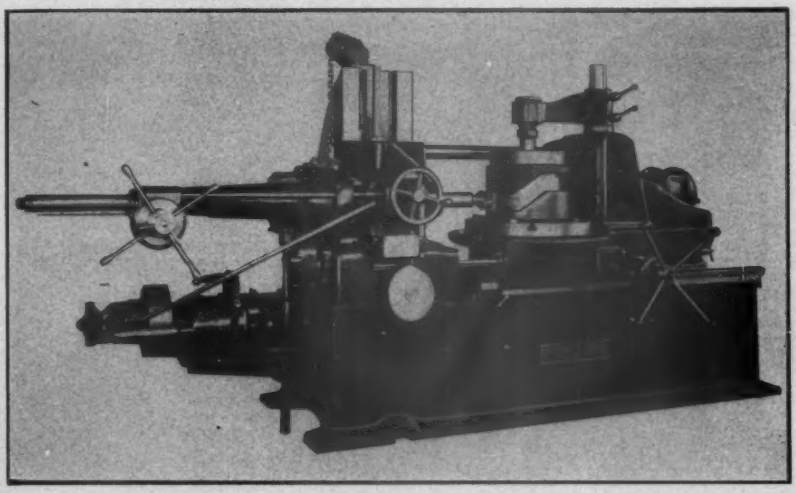

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